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## **Assessing environmental performance of humidification technology used in supply of fresh fruit and vegetables**

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Distributions chains in Europe of most fresh fruit and vegetables follow a pattern where fruit or vegetables produced in southern European countries are typically transported to countries in the central or northern parts of Europe. The relatively complex supply and distribution chain with many actors involved (from farmers, through wholesalers, to retailers) highlights the need for minimizing food loss in the post-harvest to optimize the overall environmental performance of agricultural systems in Europe.

Humidification is an emerging technology that can potentially contribute to minimize post-harvest losses of fruit and vegetables. Humidifiers release a fine mist thereby reducing the difference in water vapour pressure at the surface of the fruit or vegetable and in the air, preventing dry-out of fruits and deterioration. In addition, humidification provides cooling as a result of the evaporation of the droplets into the unsaturated air, without exchange with the environment (adiabatic cooling effect). The overall environmental performance of the humidification technology is expected to be determined by the trade-offs between lower environmental impacts stemming mainly from a reduction in loss and associated agricultural efforts and increased impacts mainly due to the need for new equipment and increased water use.

We assessed environmental performance of humidification technology in the European context. Lettuce produced in Italy and transported to Denmark was chosen as a case study, and sensitivity scenarios considered strawberries, flat peaches, asparagus, and table grapes. The results show that the technology has the potential to reduce life cycle environmental impacts, provided that it allows reducing food loss in the post-harvest. When compared to the conventional supply chain of lettuce without humidification, the impact scores are reduced on average by 2.6, 6.0 and 7.4% when the total losses of the supply chain are decreased by 2, 5 and 6%, respectively (corresponding to low, medium and high efficiency of the technology). This is true for all impact categories, except resource depletion which is driven by the humidifier production and disposal stages rather than agriculture. Thus, depending on the performance of humidifying units, humidification may have the potential to reduce environmental impacts stemming from supply of fresh fruit and vegetables in Europe.